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ABSTRACT

Technical Communication Competence (TCC) is the competence involved in communicating mental images to others in such a manner as to result in their constructing comparable mental images, a process similar to the primary task demanded of teachers at all levels. In a study designed to discover the extent to which a positive relationship existed between TCC and perceived teacher success, 32 college students in a basic speech communication class were videotaped while describing a drawing of a series of connected geometric shapes. The videotapes were later shown to students in other sections of the communication course, who were instructed to draw the described image as exactly as possible. These responses were scored by two specially trained coders, who then assigned TCC scores to the 32 students who had been videotaped. Next, four evaluators, all candidates for advanced degrees in education, viewed the videotapes. They were told that they were seeing undergraduate education majors preparing for student teaching and were asked to rate each subject's potential for success, both as a teacher at a given level and as a teacher of a given subject area. The results of this evaluation were then compared to the TCC ratings assigned earlier. A significant relationship was found between the two ratings, suggesting that this measurement technique might be useful in the area of instructional communication. (FL)

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TECHNICAL COMMUNICATION COMPETENCE AND PROJECTED TEACHER SUCCESS

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TECHNICAL COMMUNICATION COMPETENCE
AND PROJECTED TEACHER SUCCESS

During the last few years there has been an increasing surge of interest among communication scholars to identify communication-based characteristics that relate to or would be predictive of teacher success (Daly, Spicer, and Bassett, 1979). That work is based upon an assertion of relationship, both conceptually and empirically, between the body of knowledge amassed by scholars in the general area of human communication and the success achieved by teachers in the educational environment.

The success of a contemporary educator certainly encompasses the education provided to students in non-academic areas (i.e., societal values) and the teacher's association with immediate peers, administration and other educators at a state, regional, and national level. The primary criteria of evaluation, however, remains the extent to which students learn specific academic material.

While a teacher's communication skills certainly impact the potential to succeed in all the above criteria, such skills are paramount in achieving success with academic learning. Undoubtedly, one could argue that numerous variables such as the teacher's and the student's intelligence, preparedness and motivation, as well as the educational environment, impact the academic learning criteria of teacher success. Yet one could equally argue that these are antecedent variables which have their primary impact upon the communication which occurs in the educational situation.

Success, itself, is a nebulous term in both educational and scientific circles. The instances described above only point to the multitudinous applications of the term. Recognizing the complexity associated with the construct of teacher success, one could approach the problem by taking a gestalt perspective on what one perceived as critical components of teacher success. The latter approach would appear to yield the greatest information given the restrictions inherent in perspectives of any single group of researchers. Given that restriction and recognizing the complexities associated with teacher success, this research attempted to contribute to the gestalt picture associated with the communicative competence component of teacher success.

Aspects or dimensions of communication competence within specifically the educational environment has been explored by several scholars (Abelson, 1970; Burke and Stone, 1975; Craig, 1974; Ingersoll, 1975; Wynn, 1974). The more recent work of Daly, Spicer, and Bassett (1979) identified seven dimensions of communication competence associated with teacher success. These are social communication, skill adaption, clarity, teacher-parent communication, communication with peers, ethnic group communication, and communication with aides. Typically the preceding research has attempted to identify components of the construct associated with overall teacher competence. Invariably, components emerge in this research which have a direct association to the communication skills of teachers.

Communication competence has also been examined as it applies to the components necessary for success in social situations.

Allen and Brown (1976) suggest that communication competence should be measured by the language system developed by Gordon Wells (1973). Wells posits five components of communication acts: controlling, sharing feelings, informing, ritualizing, and imagining. While this functional model is useful as an overall approach to communication competence it lacks parsimony and does not suggest a means of measurement in each area of competence. Bassett, Whittington, and Spicer (1978) suggest nineteen competencies under four general headings: communication codes, oral message evaluation, basic speech communication skills, and human relations. Backlund's (1978) components include ability to demonstrate, knowledge, social appropriateness, communication behavior, and context. While other studies could be cited, Wiemann's (1978) summary of the research in communication competence seems most succinct. The existence of three general dimensions (empathy, behavioral flexibility, and interaction management) appear consistent across a variety of research. These studies, utilizing primarily self-report or external observer measures, suggest that communication competence is multidimensional or composed of distinctive and separate conceptual components which may be differentially applied to the different communication environments and goals confronted by contemporary evaluation.

Recently, a different perspective has emerged regarding the general construct of communication competence which appears especially applicable to the educational environment and the potential success of educators. Powers (1979) suggests that at least two distinct areas of communication competence are present:

(1) the competence involved in developing appropriate and motivating mental images (mental image represents that which is desired to be communicated), and (2) the competence involved in communication of those mental images in such a manner as to result in comparable mental images being constructed by the recipients of that communication.

The former competency is certainly related to many complex factors and clearly represents the cognitive perspective related to the generation of thought. The evaluation of the mental image regarding correctness, appropriateness, and motivating qualities appear similar to many of the dimensions of communication competence mentioned earlier. The latter competency represents the behavioral or delivery component of previous conceptualizations of communication competence in a technical manner. This competency is termed Technical Communication Competence (TCC). The competency or skill index of TCC then becomes the similarity between mental images held by the initiator (I) and the respondent (R). Given the many variables influencing individual decoding skills, the TCC of any I would be the average similarity when I is communicating to a randomly selected group of R's.

In the initial report, Powers (1979) develops a method of measuring TCC and examines its potential impact. Data analysis suggests the construct is measurable and further that it impacts perceptions of credibility (especially competence) and interpersonal attraction (especially task attraction) by participants in the communication event. Due to the behavioral base of the

construct, individuals external to the communication event should tend to be impacted in a comparable though more restrained manner.

This construct bears a remarkable conceptual similarity to the primary task assigned a teacher. In a given classroom situation the teacher has a particular set of mental images representing specific academic material. At the conclusion of the class, students also have mental images representing that material. The degree of success is inherently bound to the similarity of mental images between the teacher and the students.

This conceptual similarity led to the development of the following research question:

> To what extent does a positive relationship exist between TCC and perceived teacher success?

The obvious differences in intellectual development and academic complexity associated with primary, secondary, and higher education levels led to the examination of this research question within all three teacher level classifications. Further, the differences in teacher style commonly found between the broad academic classifications of math and science, and fine arts suggested the viability of examining the research question within those classifications as well.

Method

The TCC data generated in the original research by Powers (1979) were utilized in the present project.

Procedures

Thirty-two randomly selected subjects from basic college speech communication classes were requested to participate in the project as communication initiators (I). Subjects were informed only that they would be involved in a communication activity which would be video-taped and shown to other students for evaluation. As each subject reported to the experimental room, he/she was seated at a low table. Instructions were as follows:

> Communicate this material to the two students behind the one-way glass in such a manner that they can exactly duplicate what you see here. They will be drawing as you communicate to them. You may do or say anything you like except turn around and draw it on the blackboard. We will be video-taping for later analysis so examine the material and as soon as you are ready tell my assistant. He will start the tape and let you know when to begin. He has been instructed to stop you in exactly five minutes from the time you start unless you have finished your communication before that time. Do you have any questions? Okay, just let him know when you're ready and direct your communication to the two folks in the next room.

The material or mental image given each subject was a single series of connected geometric shapes (see Figure A) depicted on standard 8-1/2" x 11" paper. This particular form was selected by pretesting fifteen comparable forms for perceived difficulty by forty-two randomly selected subjects from the same population.

Subjects were asked to indicate the degree of difficulty involved were they asked to communicate each form. Subjects responded to

--Insert Figure A Here--

each of the fifteen designs on a 1-9 scale bound by the adjectives Simple-Complex. The selected form had the following descriptive statistics: $\bar{X} = 5.5$, S.D. = 1.671, $S^2 = 2.792$, kurtosis = -0.525, skewness = 0.307, SE = 0.258. The data of the selected form represented the closest approximation to a normal distribution of responses within the group of forms tested.

Following completion of the TCC communication activity each subject was requested to not discuss it with others until the next day. This phase of the project was completed in one day. Subjects were later queried as to their belief regarding the presence of two other students in the adjoining room. Three subjects responded that they questioned such presence later, but had not doubted the stated presence during the communication event. All other subjects indicated they had not doubted the situation in any way.

Each videotape was then shown the following semester to a randomly assigned section of students drawn from thirty-two sections of basic communication classes. The respondent (R) group size for any I varied from 20-27 depending upon section enrollment and the number of students in more than one class. A total of 717 students served the R function. All R's were instructed in the following manner:

The top page of your research packet is blank. I am going to show you a color video-tape of a student from last semester communicating a very specific image. Listen very closely and draw on the blank sheet the images presented by the communicator as exactly as you can. Some speakers are very fast talkers. You will have to draw while he/she is talking so be prepared to work very quickly. If you become lost, pick it up whenever you can. Are there any questions? Get ready.

The scoring of TCC was conducted in the following manner: two graduate students were trained in scoring procedures. The procedures were exact: 1 point for each correct geometric shape, 2 points for each correct relationship between two geometric forms, 1 point for connecting all geometric forms, 1 point for placement of starting form within Area Start, 1 point for placement of ending form within Area End, and 1 point for placement of the entire set of forms within Area Vertical (see Figure B). This yielded a

--Insert Figure B Here--

potential range of 0-29 for each R. The average R score for each I represented each I's TCC score (also having a potential range of 0-29).

A panel of four evaluators, all of whom were advanced candidates for the Ph.D. in Education, then viewed each of the randomly arranged thirty-two video-tapes. They were informed that each subject was an undergraduate major in the College of Education and

was to engage in student teaching soon. Evaluators were further informed that each subject was attempting to communicate the same set and arrangement of geometric forms to an audience of peers. The actual form was not displayed. Evaluators were then asked to rate the success potential of each I immediately after viewing the video-tape in the following individual nine areas: overall potential as an elementary teacher (OPET), elementary teacher of math and science (ETMS), elementary teacher of fine arts (ETFA), overall potential as a secondary teacher (OPST), secondary teacher of math and science (STMS), secondary teacher of fine arts (STFA), overall potential as a college teacher (OPCT), college teacher of math and science (CTMS), and college teacher of fine arts (CTFA). Three seven step semantic differential type scales bound by the adjectives success-failure, incompetent - competent, and excellent-poor comprised the measure of success potential. The nine areas were randomly arranged relative to each subject and within the evaluator group. Following completion of the project, evaluators were fully debriefed.

Results

The interrater reliability of the two TCC coders was checked by having both coders initially score the same 51 R forms. Correlation coefficients were computed for each scoring component and the overall score. These ranged from .90 to .99. The coders were then allowed to independently score the remaining forms. Item-item and item-total correlations for each of the nine success measures

ranged from .94 to .98. Interrater reliability (Cronback's Alpha) within each of the nine success areas ranged from .64 to .83.

Pearson product moment correlation coefficients were used to test the extent of the relationship between TCC and perceived success potential in the nine educational areas. The average R score for each I represented the TCC variable and the average total score across the four rater represented the perceived success potential variable in each area. Results of this analysis are presented in Table 1.

--Insert Table 1 Here--

On the basis of this analysis, the positive relationship between TCC and perceived success potential was statistically significant (yet moderate in terms of common variance) in all nine educational areas.

Discussion

The results of this initial probe appear encouraging, especially in light of several limitations associated with the method used to measure TCC and perceived success potential of teachers. The TCC method is being modified. At this time, it is limited by the number of subjects, the type of mental image and the lack of interaction. The measurement tools related to potential success and the use of external evaluators may be further develcped. Yet in spite of those limitations a clear association is apparent within this study between TCC and the potential for teacher success.

The similiarities suggested between the variables and between participants and observers of the communication event associated with TCC, appear to be operative. This initial preliminary work should be followed by more extensive investigations, perhaps further delineating educational levels and content areas. The TCC method allows for the possibility of using in-service teachers as I's and students from their actual grade level as R's in constructing the TCC scores. Evaluations of success may be made by the teachers' actual students as well. Should that particular line of research be consistent with the results of this study, the potential application of TCC as a diagnostic tool may be beneficial. Perhaps TCC is more critical at certain levels of education or in certain academic areas. This knowledge could assist in the counselling of education majors as to specialty fields or perhaps emphasis areas. The method may also serve as a screening device with the most obvious application to international students desiring to become teaching assistants in the college environment. Modifications of the TCC method are essential regarding its present limitations and administrative complexity.

The potential applied value of this method is large. The pragmatics of such application await further study. The theoretical significance of the TCC method within the educational framework awaits a clearer picture of the construct and its relationship to the educational environment as a whole. It is suggested, however, that this conceptualization of communication competence and

this measurement technique are viable and useful within the broad scope of human communication and the specific area of instructional communication.

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FIGURE A

TCC Mental Image

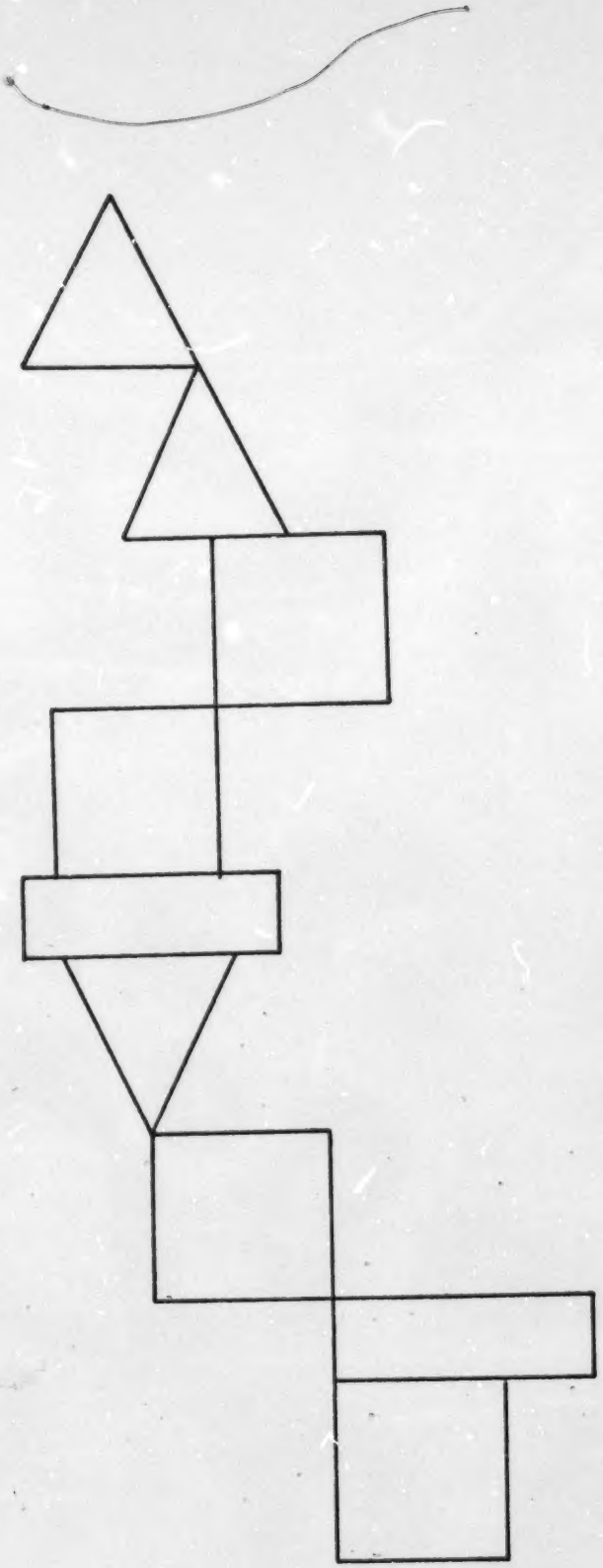

FIGURE B

TCC Scoring Areas

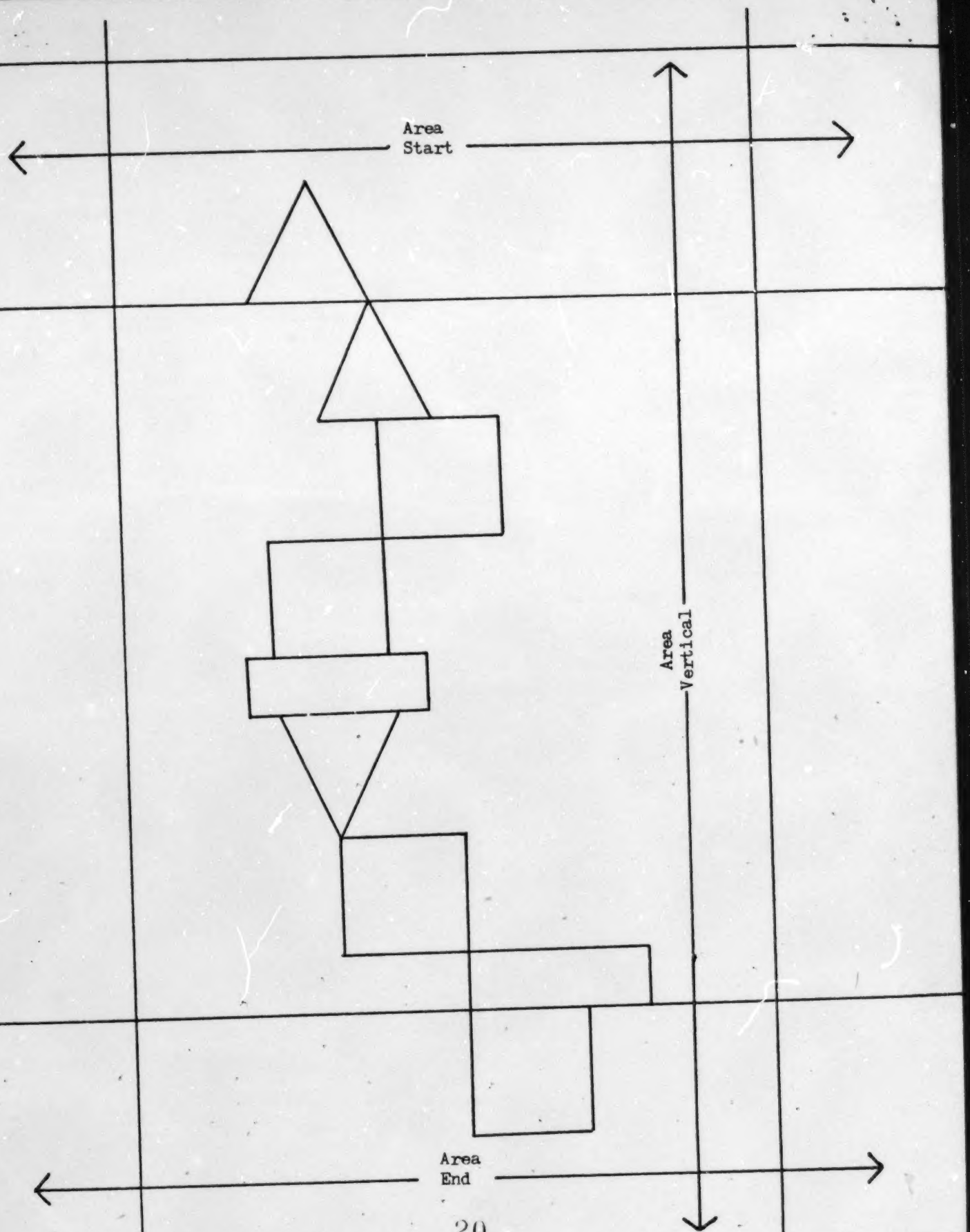
Area
Start
Area
Vertical
Area
End

TABLE 1

TCC and Teacher Success
Correlations and Variance

TCC and Teacher Success
Correlations and Variance

Educational Area	r	r^2
OPET	.48	.23
ETSM	.49	.24
ETFA	.43	.19
OPST	.54	.29
STSM	.53	.28
STFA	.56	.31
OPCT	.49	.24
CTSM	.49	.24
CTFA	.53	.28

NOTE: All correlations were statistically significant, $p < .05$, $df = 30$.